WHAT IS CLAIMED IS:

1. A method for Optimizing Pre-saturation in a scan volume of an MRI system, comprising:

    a. creating a B_0 map for each slice of the scan volume;

    b. obtaining a first frequency for RF pre-pulses;

    c. calculating a median value for the B_0 magnetic field from the B_0 map for each scan slice;

    d. calculating the percentage of positive and negative scan slice pixels in each scan slice

2. A method for generating an image of a scan volume using an MRI system, the method comprising the steps of:

    a. generating a B_0 map of each scan slice of the scan volume by measuring B_0 magnetic field distribution over each scan slice of the scan volume;

    b. obtaining a first frequency of RF pre-pulses;

    c. calculating a median value of the B_0 magnetic field over each scan slice, the calculation being done using the B_0 field maps;

    d. calculating the percentage of positive and negative scan slice pixels in each scan slice, the calculation being done using the B.sub.0 field map for each scan slice, wherein a positive scan slice pixel is defined as a scan slice pixel with positive value in the B.sub.0 field map, and wherein a negative scan slice pixel is defined as a scan slice pixel with negative value in the B.sub.0 field map;

e.   if the percentage of either the positive scan slice pixels or the negative scan slice pixels in each scan slice is greater than a predefined threshold value, performing the step of:

      i.   calculating a second frequency of RF pre-pulses for each scan slice by correcting the first frequency of RF pre-pulses, the correction for a scan slice being done by using the median value of the B_0 magnetic field over the scan slice calculated at step c;

else performing the steps of:

      ii.   improving the shimming; and

      iii.   repeating steps a through e; and

f.   obtaining an MRI image of each scan slice, wherein the MRI image of a scan slice is obtained using RF pre-pulses at the second frequency for the scan slice.

3.   The method of claim 1 wherein the step of calculating a second frequency of RF pre-pulses for a scan slice is done by adding the median value of the B_0 magnetic field over the scan slice to the first frequency of RF pre-pulses.

4.   The method of claim 1 wherein the RF pre-pulses are used to suppress magnetic resonance signals from hydrogen nuclei in fat molecules present in the scan volume.

5.   The method of claim 1 wherein the RF pre-pulses are used to suppress magnetic resonance signals from hydrogen nuclei in macromolecules present in the scan volume.

6.   The method of claim 1 wherein the RF pre-pulses are used to suppress magnetic resonance signals from hydrogen nuclei in water molecules present in the scan volume.

7.   The method of claim 1 wherein the step of obtaining an MRI image of a scan slice comprises the steps of:

   a.   applying

        i.   RE pre-pulses at second frequency for the scan slice; and

        ii.   RE pulses at transmit frequency to the scan slice;

   b.   measuring magnetic resonance signals from the scan slice; and

   c.   processing the magnetic resonance signals to obtain an MRI image of the scan slice.

8.   A method for generating an image of a scan volume using an MRI system, the method comprising the steps of:

   a.   generating a $B.sub.0$ map of each scan slice of the scan volume by measuring $B.sub.0$ magnetic field distribution over each scan slice of the scan volume and storing the $B.sub.0$ map in a database;

   b.   obtaining a first frequency of RF pre-pulses;

   c.   calculating median value of the $B.sub.0$ magnetic field over each scan slice, the calculation being done using the $B.sub.0$ field maps stored in the database;

   d.   calculating the percentage of positive and negative scan slice pixels in each scan slice, the calculation being done using the $B.sub.0$ field map for each scan slice, wherein a positive scan

slice pixel is defined as a scan slice pixel with positive value in the B.sub.0 field map, and wherein a negative scan slice pixel is defined as a scan slice pixel with negative value in the B.sub.0 field map;

e.   if the percentage of either the positive scan slice pixels or the negative scan slice pixels in each scan slice is greater than a predefined threshold value, performing the step of:

    i.   calculating a second frequency of RF pre-pulses for each scan slice by correcting the first frequency of RF pre-pulses, the correction for a scan slice being done by adding the median value of the B.sub.0 magnetic field over the scan slice calculated at step c to the first frequency of RF pre-pulses calculated at step b;

else performing the steps of:

    ii.   improving the shimming; and

    iii.   repeating steps a through e;

f.   obtaining an MRI image of each scan slice using RF pre-pulses at second frequency for that scan slice;

g.   storing the MRI image of each scan slice obtained at step f in the database; and

h.   displaying the MRI images stored in the database on a display device.

9.   The method of claim 7 wherein the RF pre-pulses are used to suppress magnetic resonance signals from hydrogen nuclei in fat molecules present in the scan volume.

10.   The method of claim 7 wherein the step of obtaining an MRI image of a scan slice comprises the steps of:

   a.   applying

      i.   RF pre-pulses at second frequency for the scan slice; and

      ii.   RE pulses at transmit frequency to the scan slice;

   b.   measuring magnetic resonance signals from the scan slice; and

   c.   processing the magnetic resonance signals to obtain an MRI image of the scan slice.

11.   An MRI system comprising:

   a.   a polarizing magnet for producing a high intensity magnetic field called B.sub.0 magnetic field;

   b.   a set of shimming coils for improving B.sub.0 magnetic field homogeneity;

   c.   a magnetic field detector for measuring B.sub.0 magnetic field distribution;

   d.   a set of gradient coils for producing a gradient magnetic field superposed on the B.sub.0 magnetic field;

   e.   a transmitter for generating RF pulses and RF pre-pulses wherein frequency of RF pre-pulses is specific for each scan slice;

   f.   a radio frequency receiver for detecting magnetic resonance signals;

   g.   a processing module comprising:

    i.   a module for calculating the median of the $B.sub.0$ magnetic field over each scan slice;

    ii.   a module for calculating the percentage of positive and negative scan slice pixels in each scan slice, wherein positive scan slice pixels are defined as scan slice pixels with positive $B.sub.0$ magnetic field values, and wherein negative scan slice pixels are defined as scan slice pixels with negative $B.sub.0$ magnetic field values;

    iii.   a module for calculating a second frequency of RF pre-pulses for each scan slice by adding the median value of the $B.sub.0$ magnetic field over the scan slice to a first frequency of RF pre-pulses, the first frequency of RF pre-pulses being obtained by a standard procedure; <u>and</u>

    iv.   a module for processing magnetic resonance signals from a scan slice to obtain an MRI image of the scan slice-pulses for each scan slice; and

  h.   a database comprising:

    i.   a storage unit for storing $B.sub.0$ field maps;

    ii.   a second storage unit for storing the median value of the $B.sub.0$ magnetic field over each scan slice; and

    iii.   a third storage unit for storing an MRI image of each scan slice.

12.   A computer program product for use with a computer, the computer program product comprising a computer usable medium having a computer readable program code embodied therein for generating an image using an MRI system, the computer program code performing the steps of:

a.   generating a B.sub.0 map of each scan slice of the scan volume by measuring B.sub.0 magnetic field distribution over each scan slice of the scan volume;

b.   obtaining a first frequency of RF pre-pulses;

c.   calculating median value of the B.sub.0 magnetic field over each scan slice, the calculation being done using the B.sub.0 field maps;

d.   calculating the percentage of positive and negative scan slice pixels in each scan slice, the calculation being done using the B.sub.0 field map for each scan slice, wherein a positive scan slice pixel is defined as a scan slice pixel with positive value in the B.sub.0 field map, and wherein a negative scan slice pixel is defined as a scan slice pixel with negative value in the B.sub.0 field map;

e.   if the percentage of either the positive scan slice pixels or the negative scan slice pixels in each scan slice is greater than a predefined threshold value, performing the step of:

    i.   calculating a second frequency of RF pre-pulses for each scan slice by correcting the first frequency of RF pre-pulses, the correction for a scan slice being done by adding the median value of the B.sub.0 magnetic field over the scan slice the first frequency of RF pre-pulses;

else performing the steps of:

    ii.   improving the shimming; and

    iii.   repeating steps a through e; and

f.   obtaining an MRI image of each scan slice, wherein the MRI image of a scan slice is obtained using RF pre-pulses at the second frequency for the scan slice.

13.   A computer program product for use with a computer, the computer program product comprising a computer usable medium having a computer readable program code embodied therein for acquiring an image using an MRI system, the computer program code performing the steps of:

a.   generating a B.sub.0 map of each scan slice of the scan volume by measuring B.sub.0 magnetic field distribution over each scan slice of the scan volume and storing the B .sub.0 map in a database;

b.   obtaining a first frequency of RF pre-pulses;

c.   calculating median value of the B.sub.0 magnetic field over each scan slice, the calculation being done using the B.sub.0 field maps stored in the database;

d.   calculating the percentage of positive and negative scan slice pixels in each scan slice, the calculation being done using the B.sub.0 field map for each scan slice, wherein a positive scan slice pixel is defined as a scan slice pixel with positive value in the B.sub.0 field map, and wherein a negative scan slice pixel is defined as a scan slice pixel with negative value in the B.sub.0 field map;

e.   if the percentage of either the positive scan slice pixels or the negative scan slice pixels in each scan slice is greater than a predefined threshold value, performing the step of:

i. calculating a second frequency of RF pre-pulses for each scan slice by correcting the first frequency of RF pre-pulses, the correction for a scan slice being done by adding the median value of the $B.sub.0$ magnetic field over the scan slice to the first frequency of RF pre-pulses;

else performing the steps of:

ii. improving the shimming; and in repeating steps a through e;

f. obtaining an MRI image of each scan slice using RF pre-pulses at second frequency for that scan slice calculated at step e;

g. storing the MRI image of each scan slice obtained at step f in the database; and

h. displaying the MRI images stored in the database on a display device.